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EXAMINER

LINDINGER, MICHAEL L

| ART UNIT | PAPER NUMBER |
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2841

DATE MAILED: 02/28/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/703,335

Applicant(s)

BERSTIS ET AL.

Examiner

Michael L. Lindinger

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-45 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-45 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 31 October 2000 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s) ____.
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) ____ 6) ☐ Other:

DETAILED ACTION

Any Amendments to the Claims must present a clear line of distinction so as preclude Obviousness type Double Patenting Rejection. As an Example, a comparison has been made between Claim 1 of the four co-pending Applications in order to highlight the present similarities:

09/703,334 discloses a time cell, which experiences a transition of states after a programming (charging) operation, detections means for detecting a value within a charge storage element, which is located within the time cell.

09/703,335 discloses a time cell, which experiences a transition of states after a programming (charging) operation, and charging/discharging means regarding the transmission of the electrostatic charge.

09/703,340 discloses a time cell, which experiences a transition of states after a programming (charging) operation, wherein circuitry is connected to the time cell to read a state of the time cell.

09/703,344 discloses a time cell, which experiences a transition of states after a programming (charging) operation, wherein reading means are present to read a state of the time cell.

Drawings

1. Figures 1A-1J should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

2. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference sign(s) not mentioned in the description: element 328 (FIG. 3A). A proposed drawing correction, corrected drawings, or amendment to the specification to add the reference sign(s) in the description, are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Specification

1. The disclosure is objected to because of the following informalities: element 220 should be referred to as element 230 as in consistent with naming the element a time detection unit as is previously stated (pg. 47, line 6). Appropriate correction is required.
2. The disclosure states a "programming operation," which is misdescriptive and is in fact nothing more than a charging operation. Appropriate correction to the numerous instances within the disclosure containing the misdescriptive material is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

1. Claims 41-45 are rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential structural cooperative relationships of elements, such omission amounting to a gap between the necessary structural connections. See MPEP § 2172.01. The omitted structural cooperative relationships are: a clear definition of the circuitry and the relationship of the circuitry to the time cell in order to allow reading a state of the time cell, as well as a clear structural definition of the smart card and the structural relationship the smart card has to the time cell. Applicant must include

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a description, illustration, or a previous patent showing the components or features the said circuitry.

2. Claims 27-31 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 27-31 are rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential steps, such omission amounting to a gap between the steps. See MPEP § 2172.01. There are no steps for displaying or measuring time, since the methods are drawn to a horological device.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

1. Claims 1-17, 24-25, 35, and 38-45 are rejected under 35 U.S.C. 103(a) as being unpatentable over the Admitted Prior Art in view of Suzuki U.S. Patent No. 4,442,363. Regarding Claims 1 and 41-42, the Admitted Prior Art teaches a time cell comprising a charge storage element, wherein the charge storage element comprises an internal medium for storing an electrostatic charge and a insulating medium for insulating the internal medium, wherein the charge storage element possesses charging and discharging means to receive, store, and discharge and electrostatic charge, as well as all components and corresponding structural limitations previously established, as well as a discharged state before a charging operation (non-time-measuring state) and a controlled discharged state (time-measuring state) after the programming operation, hereafter referred to as a charging operation, which provides an electrostatic charge to the charge storage element (FIG. 1A). The Admitted Prior Art does not teach the concept of measuring electrostatic discharge the charge storage element in order to obtain the corresponding elapsed time of the system. Suzuki teaches a conventional RC timer, which teaches the concept of measuring the electrostatic discharge of a charge

storage element in order to provide the corresponding elapsed time (Col. 1, lines 12+). It would have been obvious to a person skilled in the art at the time of the invention to adapt the Admitted Prior Art to form a capacitive timing system comprising existing structure with the ability to measure electrostatic discharge, as taught by Suzuki, in order to measure elapsed time. Both the Admitted Prior Art and Suzuki possess a charge storage element that provides an electrostatic discharge and the ability to read this discharge and provide a corresponding elapsed time is an existing teaching provided by Suzuki. By applying the existing concept of reading the electrostatic discharge of a generic charge storage element of Suzuki to the Admitted Prior Art, elapsed time results could be determined in the same manner only for any different structural source of the electrostatic discharge.

Regarding Claims 2-4, the combined Admitted Prior Art and Suzuki teaches a time cell, which has the ability of a conventional RC timer to measure electrostatic discharge in order to measure elapsed time, as well as the predetermined discharge rate is non-linear with respect to time. The combination does not explicitly teach that the length of the predetermined discharge rate varies with an initial condition of the time cell after the charging operation. It would have been obvious to a person skilled in the art at the time of the invention to recognize that by applying teaching of a conventional RC timer, the length of the predetermined time period, which directly affects the predetermined discharge rate by limiting the amount of electrons passing through the insulating medium, may be altered by varying the insulating medium, which constitutes the

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structural dependent feature of the charge storage element, after the charging operation. An RC timer possesses initial conditions, such as distance between capacitive plates, which may be altered in order to vary the length of the time period before a charging operation.

Regarding Claims 5-7, the combined Admitted Prior Art and Suzuki teaches a time cell, which has the ability of a conventional RC timer to measure electrostatic discharge in order to measure elapsed time. The combination does not explicitly teach an array of time cells, or the time periods of the time cells in the array of time cell. It would have been obvious to a person skilled in the art at the time of the invention to provide an array of time cells comprising individual time periods whose values maybe the same or different, since it has been held that the mere duplication of parts for a multiplied effect, in the instant an array of time cells for various time measurements, is an obvious improvement (*In re Harza*, 274 F.2d 669, 671, 124 USPQ 378, 380 (CCPA 1960)).

Regarding Claims 8-9 and 24-25, the combined Admitted Prior Art and Suzuki teaches a time cell, which has the ability of a conventional RC timer to measure electrostatic discharge in order to measure elapsed time. The combination does not explicitly comprise a time cell interface unit, programming request unit, or a status-generating unit for initializing or setting one or more time cells, as well as generating status from the time cells. It would have been obvious to a person skilled in the art at the time of the invention to recognize that any capacitive timing device must inherently possesses the

structure and means to charge/discharge time cells, as well as the ability to determine during the charging process whether the cells were successfully charged or not. By including a time cell interface unit and a programming request unit, existing initialization structure of a typical RC timer is applied to the specific invention.

Regarding Claims 10-13 and 38-39, the combined teachings of the Admitted Prior Art and Suzuki inherently possess the methods of controlling electrostatic discharge during and after discharging and charging states of a time cell in order to gain measurement of the elapsed time of the system and the corresponding charging and read operation steps needed to initialize and process the information of the apparatus. It would be obvious to a person skilled in the art at the time of the invention to recognize that because the combination of the Admitted Prior Art and Suzuki form the structure of the inventive entity claimed, the methods needed to construct, charge, and read the components and data contained and produced are inherently possessed by the structure.

Regarding Claims 14-17 and 40, it would be obvious to a person skilled in the art at the time of the invention to construct a computer program to perform the method steps of Claims. It is well known in the art to build a computer program on a computer readable medium such as a floppy disk for easy insertion and data recall during use on a computer.

Regarding Claim 35, the combined Admitted Prior Art and Suzuki teaches a time cell comprising a tunneling region, which has the ability of a conventional RC timer to measure electrostatic discharge in order to measure elapsed time. The combination does not explicitly teach the thickness of the tunneling region being less than 7 nanometers. It would be obvious to a person skilled in the art to recognize that reducing the thickness of the tunneling region increases electron flow, thereby increasing the ability to control electrostatic discharge. A typical RC timer comprises capacitive plates whose distance relative to one another, which can comprise of air, insulating material or any non-conductive material, can be varied in order to increase or decrease the amount of electrons that pass through the gap during electrostatic discharge, therefore controlling the electrostatic discharge. By applying a typical RC timer characteristics regarding thickness of the insulating region, the electrostatic discharge of a charge storage element can be controlled.

Regarding Claim 43, the combined Admitted Prior Art and Suzuki teaches a time cell, which has the ability of a conventional RC timer to measure electrostatic discharge in order to measure elapsed time. The combination does not explicitly teach an article of manufacturing comprising a smart card. It would be obvious to a person skilled in the art at the time of the invention to adapt a smart card to include a charge storage device, e.g. an RC timer device in order to measure elapsed time of a charged storage element with a smart card in order to calculate the elapsed time memory has been stored on a smart card. Any capacitive timing device possesses memory and means to store and

read the memory and by applying this concept of measuring electrostatic discharge to calculate memory, a user may read the elapsed time a portion of memory that has been stored on the smart card and recharge or update the memory before it is erased.

Regarding Claims 44-45, the combined Admitted Prior Art and Suzuki teaches a time cell, which has the ability of a conventional RC timer to measure electrostatic discharge in order to measure elapsed time. The combination does not explicitly teach coupling means or time determining means. It would have been obvious to a person skilled in the art at the time of the invention to recognize that any capacitive timing device must inherently possess the structure and means to read and interpret data as to whether or not a predetermined time period has elapsed in order to verify the time at which to charge the time cell again. By explicitly including coupling means for a reading device and time determining means for time period verification, existing reading operations of a typical RC timer is applied to the specific invention.

2. Claims 18-23, 26-34, 36-37 are rejected under 35 U.S.C. 103(a) as being unpatentable over the Admitted Prior Art. Regarding Claims 18-23, 26, the Admitted Prior Art teaches a horological device comprising all of the structural features shown in FIGURE 1A: a semiconductor substrate 102, a source region 104, a drain region 106, a channel region 122 between the source region and the drain region, a control gate 116, a floating gate 118 between the control gate and the channel region, wherein the floating gate behaves as a charge stored element in a floating gate field effect transistor

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(FGFET), wherein an internal medium is provided within the charged storage element to receive programming operations, hereafter referred as charging operations, an insulating medium 120 surrounding the internal medium, wherein the insulating medium has a tunneling region for discharging an electrostatic charge, wherein said insulating medium has physical properties which affect the rate of discharge in a discharge process, wherein one of these physical properties is the thickness of the insulating medium. The discharge process is a non-linear Fowler-Nordheim tunneling process and the charging process is a channel hot electron injection process, which comprising a charge injector for injecting said charge into charge storage element, further comprises a programming unit, hereto referred to as a charging unit for charging the charge storage element. The combination does not explicitly teach an electrostatic detector physically coupled to the charge storage element for allowing a detection of an electrical potential within the internal medium. It would have been obvious to a person skilled in the art at the time of the invention to recognize that the Admitted Prior Art comprises read operations that provide a read operation voltage, which is analyzed in order to provide an indication that the floating gate has been charged, therefore in essence detecting an electrical potential within the internal medium and processing the information. By stating that an electrostatic detector is included in the invention, the Claims are restating existing read operation and subsequent data interpreting steps in the Admitted Prior Art.

Regarding Claims 27-31, the Admitted Prior Art teaches a horological device comprised of charging a charge storage element that is a floating gate in a floating gate field effect transistor (FGFET), wherein the charge storage element comprises an internal medium for storing the electrostatic charge, and a insulating medium surrounding the internal medium, wherein as stated previously the physical properties of the insulating medium affect the rate of electrostatic discharge, as well as means to charge and verify whether or not the charging process was a successful process. The Admitted Prior Art does not explicitly teach the method for using a horological device comprising the above stated characteristics. It would be obvious to a person who is skilled in the art at the time of the invention to recognize that because the Admitted Prior Art teaches all of the necessary structure, the methods of charging a charge storage element within controlling electrostatic discharge during and after discharging and charging states of a time cell in order to gain measurement of the elapsed time of the system and the corresponding charging and read operation steps needed to initialize and process the information of the apparatus are inherently possessed within said structure.

Regarding Claims 32-34 and 36, the Admitted Prior Art teaches a horological device comprising all of the structural features shown in FIGURE 1A: a semiconductor substrate 102, a source region 104, a drain region 106, a channel region 122 between the source region and the drain region, a control gate 116, a floating gate 118 between the control gate and the channel region, wherein the floating gate behaves as a charge stored element in a floating gate field effect transistor (FGFET), wherein an internal

medium is provided within the charged storage element to receive programming operations, hereafter referred as charging operations, an insulating medium 120 surrounding the internal medium, wherein the insulating medium has a tunneling region for discharging an electrostatic charge, wherein said insulating medium has physical properties which affect the rate of discharge in a discharge process, wherein one of these physical properties is the thickness of the insulating medium, wherein the tunneling region is located between the floating gate and the channel region. The discharge process is a non-linear Fowler-Nordheim tunneling process and the charging process is a channel hot electron injection process, which comprising a charge injector for injecting said charge into charge storage element, further comprises a programming unit, hereto referred to as a charging unit for charging the charge storage element. The Admitted Prior Art discloses the claimed invention except for a second source region, a second drain region, a second channel region between the source region and the drain region, and a second control gate. It would have been obvious to one having ordinary skill in the art at the time the invention was made to provide multiple locations of electrostatic discharge in order to increase acquired data, since it has been held that mere duplication of the essential working parts of a device involves only routine skill in the art. *St. Regis Paper Co. v. Bemis Co.*, 193 USPQ 8.

Regarding Claims 37, the Admitted Prior Art teaches the structure as described in detail above, as well as the ability to measure threshold voltage of the floating gate field effect

transistor at a predetermined time after charging operations are performed on the floating gate (FIG. 1C-1J).

Prior Art

1. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

- Begin U.S. Patent No. 4,995,019 discloses a time period measuring apparatus wherein time measure is achieved by utilizing a time variable interpose, which comprises components that correspond to an RC circuit.
- Curtis U.S. Patent No. 5,195,061 discloses a practice timer for measuring elapsed time during an activity comprising a variable time constant RC circuit.
- Takeda U.S. Patent No. Re. 35,043 discloses a self-charging electronic timepiece comprising a time constant RC circuit.
- Sakaki U.S. Patent No. 5,500,834 discloses a device for measuring time elapsed after a turn off of a power source utilizing, among other components, the electrostatic capacitance of a capacitor during measurement proceedings.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael L. Lindinger whose telephone number is (703) 305-0618. The examiner can normally be reached on Monday-Thursday (7:30-6).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Martin can be reached on (703) 308-3121. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 305-3431 for regular communications and (703) 305-3431 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

Michael L. Lindinger
Patent Examiner
Art Unit 2841

MLL
February 22, 2002


Bernard Roskoski
Primary Examiner